

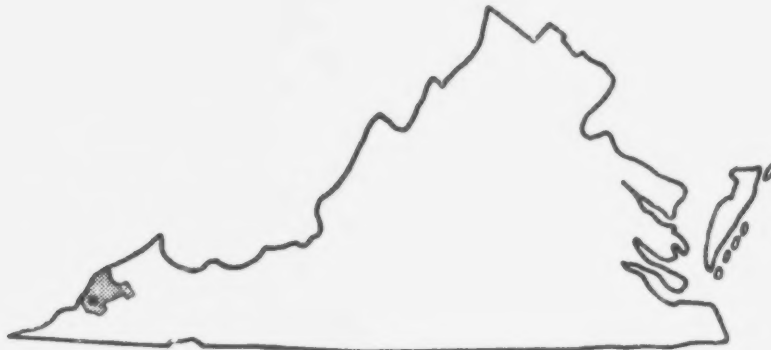
SEP 16 1989

FEMA 209.510319, '987

FLOOD INSURANCE STUDY



**TOWN OF
APPALACHIA,
VIRGINIA
WISE COUNTY**



REVISED
SEPTEMBER 15, 1989



Federal Emergency Management Agency

COMMUNITY NUMBER - 510319

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision (LOMR) process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Flood Insurance Study Effective Date: September 17, 1980

Flood Insurance Study Revised: September 15, 1989

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PUBLISHED SEPARATELY:

Flood Insurance Rate Map

FLOOD INSURANCE STUDY
TOWN OF APPALACHIA, VIRGINIA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Town of Appalachia, Wise County, Virginia, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in their efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses in this study represent a revision of the original analyses prepared by the Tennessee Valley Authority (TVA) for the Federal Insurance Administration, under Inter-Agency Agreement IAA-7-77, Project Orders 8 and 8A1.

The revised hydrologic and hydraulic analyses presented in this study were also prepared by the TVA for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement EMW-86-E-2223, Project Order 2. This study was completed in April 1987.

1.3 Coordination

In March 1985, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives from FEMA, the town, and the TVA (the study contractor) to explain the nature and purpose of the study, to review the scope and limits of work, and to obtain flood information currently available concerning the community.

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On June 8, 1988, a final CCO meeting was held with representatives of FEMA, the town, and the study contractor to review the results of the study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Appalachia, Wise County, Virginia. The area of study is shown on the Vicinity Map (Figure 1).

The Powell River, including its backwater effects on Pigeon Creek, Callahan Creek, and Looney Creek were studied by detailed methods for their entire lengths within the community. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through April 1992.

Pounding Mill Branch was studied by approximate methods. However, flooding on Pounding Mill Branch was found to be negligible and therefore, no boundaries have been shown on the map. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Town of Appalachia.

2.2 Community Description

The Town of Appalachia is situated in southwestern Wise County, in southwestern Virginia, approximately 25 miles northwest of Kingsport, Tennessee. The incorporated area of the town, which was 0.8 square mile in 1960, has now increased to 2.3 square miles. Appalachia is located on the Powell River, approximately three miles above the Town of Big Stone Gap, Virginia. Callahan Creek, a tributary with a drainage area of 28.9 square miles, joins the Powell River within the corporate limits of Appalachia. The Appalachia corporate limits extend approximately 2.11 miles along the Powell River, from mile 181.67 to mile 183.78; and from the confluence of the Powell River and Callahan Creek, to mile 1.42 along Callahan Creek.

Population had been steadily declining in the Town of Appalachia for a period, but the 1980 population was 2,418, representing a 12 percent increase from the 1970 figure of 2,161 (References 1 and 2).

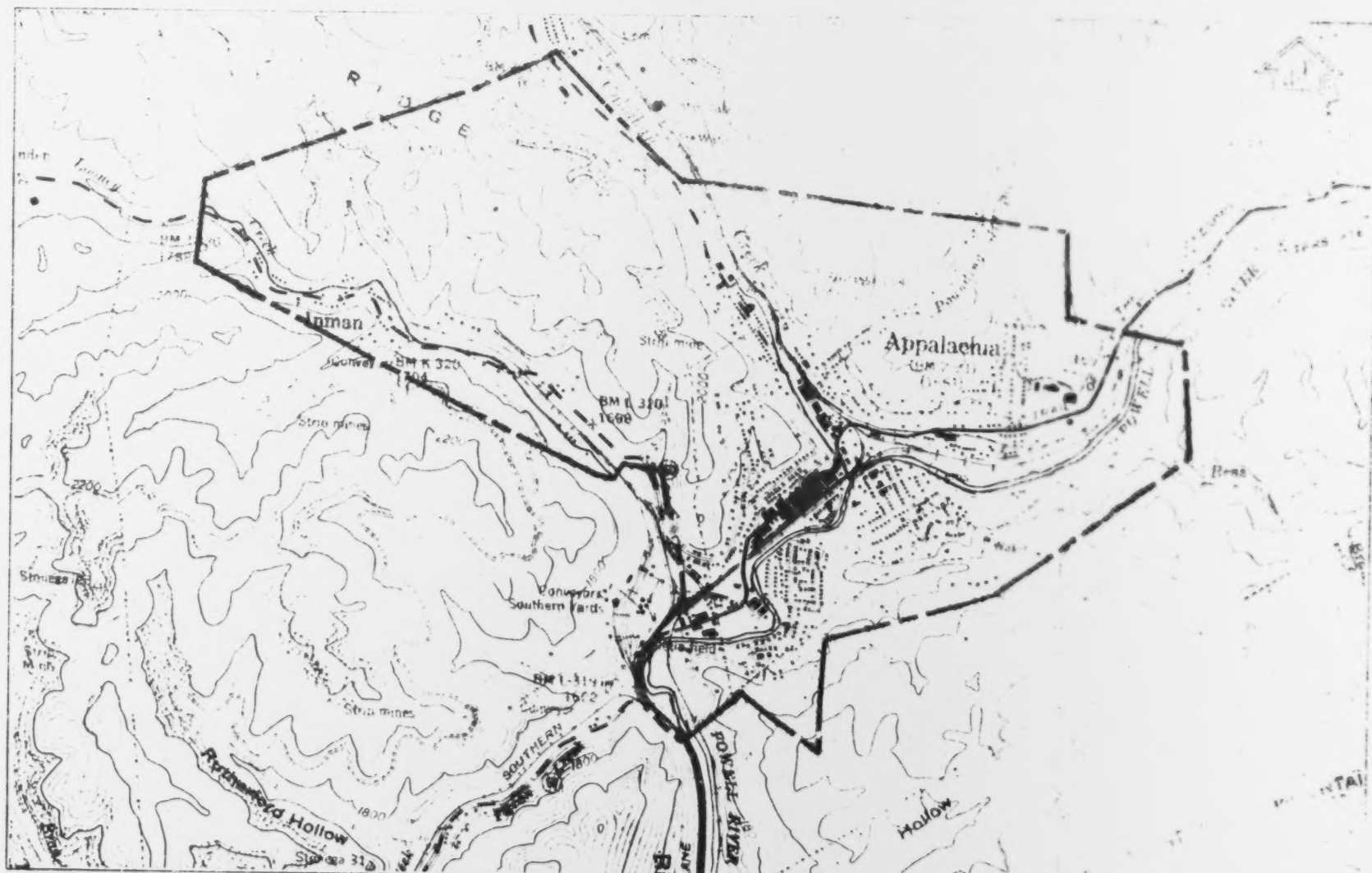


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF APPALACHIA, VA
(WISE CO.)

APPROXIMATE SCALE

2000 0 2000 4000 6000 FEET

VICINITY MAP

The principal residential development of Appalachia is on high ground on both sides of the Powell River, but there are considerable commercial and residential developments on land along the Powell River and Callahan Creek. Portions of this land have been inundated by floods of the past.

The Town of Appalachia has a warm-temperate continental climate with cool summers and no distinct dry season. The average summer temperature is 68.4 degrees Fahrenheit ($^{\circ}$ F); the average winter temperature is 34.6 $^{\circ}$ F. The average annual precipitation of 44.49 inches is reasonably well distributed throughout the year but noticeably less in the late summer and early fall (Reference 3).

2.3 Principal Flood Problems

The primary sources of flooding in Appalachia are the Powell River and Callahan and Looney Creeks. Inadequate bridge and culvert opening on the Powell River at miles 181.97, 182.26, 182.58, and 183.70; on Callahan Creek at miles 0.04 and 1.42; on Looney Creek at mile 1.06; and on Pigeon Creek at miles 0.01 and 0.02 aggravate flood problems on these streams.

Information about past flooding on the Powell River is available from local residents, newspaper articles, and previous TVA reports (References 4 and 5). In addition, stream gage records from 1945 to the present at the U. S. Geological Survey (USGS) gage (No. 03529500) located immediately upstream from the U. S. Highway 23 bridge in Big Stone Gap (mile 179.2) are available. These records, supplemented by pre-record flood investigations, are indicative of past Powell River flooding in Appalachia.

The largest flood on the Powell River since at least 1918 occurred on April 5, 1977. At the Big Stone Gap gaging station, the flood reached elevation 1,475.6 with an estimated discharge of 24,000 cfs. The 1977 flood reached elevation 1,646.1 at the Kilbourne Avenue bridge at mile 182.81 in Appalachia. The estimated recurrence interval of the April 5, 1977, flood was approximately 120 years. Floodwater inundated the lower lying sections of the town causing an estimated 350 to 400 families to evacuate their homes. An official of the Appalachia Division of the Southern Railway System estimated the cost of repairing 25 miles of damaged track at approximately \$500,000 (Reference 4).

The six largest floods since at least 1918 at the USGS stream gage site on the Powell River at mile 179.2 in Big Stone Gap, as well as flood crest elevations at the Kilbourne Avenue bridge in Appalachia are shown in the following tabulation:

Mile 179.28 at Big Stone Gap Gage				Mile 18.41 at Wilbourne Avenue in Appalachia
Date of Crest	Elevation (feet)	Peak Discharge (cfs)	Recurrence Interval (years)	Elevation (feet)
04/05/77	1,475.6	24,000	120	1,646.1
01/1918	1,474.8*	22,000	100	**
03/12/63	1,472.8	16,800	40	1,641.4
05/07/84	1,470.0	11,300	10	**
03/07/67	1,469.9	10,700	10	**
12/30/69	1,469.5	10,100	10	1,638.0

* Elevation based on high-water mark

**Data not available

On Callahan Creek, flood information is available from high-water marks obtained by TVA following the floods of April 1977, March 1963, January 1957, and December 1969, and previous TVA reports (References 4 and 5). The April 1977 flood is the largest known to have occurred on Callahan Creek since at least 1918. The creek reached an elevation of 1,647.0 at the U. S. Highway 23-58A bridge at mile 0.07 with an estimated recurrence interval of approximately 50 years. State Highway 78 was severely damaged at Andover. The floodwaters carried tons of silt and debris from the Stonega, Derby, and Roda areas leaving approximately 4 feet of mud on Callahan Avenue. The creek also flooded businesses along State Highway 78 (Reference 4).

No historical flood information is available within the study limits for Looney Creek and Pigeon Creek.

2.4 Flood Protection Measures

There are no flood protection structures in Appalachia. Non-structural measures of flood protection are being used to aid in the prevention of future flood damage. These are in the form of land-use regulations, adopted from the Code of Federal Regulations that control building within areas having a high risk of flooding (Reference 6).

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for

flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

The peak discharge-frequency relationships for the Powell River are based on the USGS gaging stations at Big Stone Gap (No. 03529500, mile 179.2, 112 square miles, period of record 1945-1985), and near Jonesville (No. 03531500, mile 143.1, 319 square miles, period of record 1932-1981 and included available historic information). Peak discharge-frequency for different locations in Appalachia were determined by extrapolation from the downstream gages.

Due to the lack of stream gage records on the remaining detailed study streams, regional relationships were used to estimate peak discharge-frequency. The adopted TVA relationships were determined from gage records on watersheds with hydrometeorologic characteristics similar to those of the streams studied in detail. The stations used are shown in the following tabulation:

<u>Stream</u>	<u>Gage No.</u>	<u>Drainage Area (Sq. Miles)</u>	<u>Period of Record</u>
Bear Branch			
Near Noble, KY	03278000	2.21	1955-1982
Prater Creek			
At Vansant, VA	03207400	19.8	1955-1977
Yellow Creek bypass			
At Middlesboro, KY	03401500	35.3	1941-1982
South Fork Powell River			
At Big Stone Gap, VA	03530000	40.0	1945-1947 1951-1977
Leatherwood Creek			
At Daisy, KY	03277400	40.9	1965-1982

<u>Stream</u>	<u>Gage No.</u>	<u>Drainage Area (Sq. Miles)</u>	<u>Period of Record</u>
Stony Creek			
At Ft. Blackmore, VA	03525000	41.4	1950-1977
Martins Fork			
Near Smith, KY	03400800	55.8	1968-1977
Johns Creek			
Near Meta, KY	03210000	56.3	1939-1982
Yellow Creek			
Near Middlesboro, KY	03402000	60.6	1941-1982
Carr Fork			
Near Sassafras, KY	03277450	60.6	1964-1975
Cutshin Creek			
At Wooton, KY	03280700	61.3	1958-1982
North Fork Kentucky River			
At Whitesburg, KY	03277300	66.4	1957-1982
Cranes Nest River			
Near Clintwood, VA	03208950	66.5	1964-1982
North Fork Powell River			
At Pennington Gap, VA	03530500	71.4	1945-1982
Poor Fork			
At Cumberland, KY	03400500	82.3	1940-1982
Clover Fork			
At Everts, KY	03400700	82.3	1940-1982
Guest River			
Near Coeburn, VA	03524500	87.3	1945-1982
Powell River			
At Big Stone Gap, VA	03529500	112.0	1945-1982
Licking River			
Near Salyersville, KY	03248500	140.0	1939-1982
Red Bird River			
Near Big Creek, KY	03281040	155.0	1972-1982
Goose Creek			
At Manchester, KY	03281100	163.0	1965-1982
Troublesome Creek			
At Noble, KY	03278500	177.0	1950-1981
Middle Fork Kentucky River			
Near Hyden, KY	03280600	202.0	1957-1982
Johns Creek			
Near Van Lear, KY	03211500	206.0	1938-1949

Flood-frequency curves for these streams were computed using the procedure outlined in USGS Bulletin 17B including the skew map of Plate 1 and adjustments for historic flood information where available (Reference 7). The results of these analyses were combined to develop the regional relationships applicable to Appalachia.

Flow estimates based on the adopted regional relationships were compared to estimates using relationships developed for the region by the USGS (Reference 8). For the range of drainage areas and channel slopes used in the hydrologic analyses, the discharges from the adopted regional relationships are approximately 55 percent higher than the estimates from the USGS-developed relationship for Virginia hydrologic area F (applicable to Appalachia).

The differences between the adopted regional relationships and those of the USGS result mainly from the different gaged watersheds used in each analysis. The adopted relationships were determined from gaged watersheds with areas less than approximately 200 square miles and within the Cumberland Plateau physiographic province.

The USGS relationships for Virginia, area F, were developed using gages in the valley and ridge, and Blue Ridge physiographic province which, are distinctly different than watersheds on the Cumberland Plateau. The Blue Ridge physiographic province is far enough from Appalachia so as to be judged meteorologically different. Furthermore, approximately half of the watersheds used in the USGS relationships were larger than 200 square miles, and judged dissimilar to the streams studied by detailed methods.

TABLE 1 - SUMMARY OF DISCHARGES

<u>FLOODING SOURCE AND LOCATION</u>	<u>DRAINAGE AREA (sq. miles)</u>	<u>PEAK DISCHARGES (cfs)</u>			
		<u>10-YEAR</u>	<u>50-YEAR</u>	<u>100-YEAR</u>	<u>500-YEAR</u>
POWELL RIVER					
At mile 180.3	111.0 ¹	10,400	17,300	20,900	31,300
At mile 181.9, downstream of confluence of Pigeon Creek	108.0 ¹	10,400	17,300	20,900	31,300
At mile 181.9, upstream of confluence of Pigeon Creek	91.1 ¹	9,000	15,200	18,400	27,900
At mile 182.8, downstream of confluence of Callahan Creek	90.0 ¹	9,000	15,200	18,400	27,900
At mile 182.8, upstream of confluence of Callahan Creek	61.1 ¹	6,500	11,200	13,600	20,800
At mile 183.7	59.6 ¹	6,500	11,200	13,600	20,800

¹ Net drainage area excluding sink areas

TABLE 1 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs)			
		10-YEAR	50-YEAR	100-YEAR	500-YEAR
CALLAHAN CREEK					
At confluence with the Powell River	28.9 ¹	4,000	6,300	7,400	11,000
At mile 1.42	27.3 ¹	4,000	6,300	7,400	11,000
LOONEY CREEK					
At confluence with the Powell River	5.97 ¹	1,200	1,900	2,300	3,300
At mile 2.13	3.98 ¹	900	1,500	1,800	2,700

¹Net drainage area excluding sink areas

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections were field surveyed at bridges and other strategic locations at sufficiently close intervals to accurately compute water-surface elevations. All bridges and culverts were surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2). No profile for Pigeon Creek has been included in this study because the flooding for its entire length is controlled by backwater from the Powell River.

Water-surface elevations of floods of the selected recurrence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 9). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for the Powell River were obtained from the Flood Insurance Study for the Town of Big Stone Gap. Starting elevations for Callahan Creek and Looney Creek were calculated by the slope/area method.

Channel roughness factors (Manning's "n") used in the hydraulic computations were determined on the basis of field inspections of the channels and floodplain areas, previous studies by the TVA, and computed coefficients based on known flood profiles. Roughness values for the channel and overbank areas for the streams studied by detailed methods are shown in the following tabulation:

<u>Stream</u>	<u>Channel "n"</u>	<u>Overbank "n"</u>
Powell River	0.020 - 0.070	0.035 - 0.170
Callahan Creek	0.030 - 0.055	0.040 - 0.150
Looney Creek	0.045 - 0.050	0.060 - 0.150

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study produces maps designed to assist communities in developing floodplain management measures.

4.1 Flood Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps (Reference 10). A supplemental map provided by the LENOWISCO Planning District Commission was also used.

The 100- and 500-year floodplain boundaries are shown on the Flood Boundary and Floodway Map (Exhibit 2). In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments by setting encroachments in the stream overbanks, testing these with the HEC-2 program, and adjusting and retesting them until an allowable increase in flood elevation is reached (Reference 9). This procedure has been used for many years to provide technical floodplain management assistance to Tennessee Valley communities.

In this procedure the floodway limit lines are located to allow use of some presently flood-prone areas at the expense of some increases in flood levels. The limit lines are located in a manner that provides land where it is estimated to serve the community's needs best. As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were computed at cross sections. Between cross sections, the boundaries were interpolated. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary has been shown. Portions of the floodway widths for Callahan Creek extend beyond the corporate limits. Pigeon Creek has not been listed in the Floodway Data Table because no cross sections are located within the community.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY	INCREASE
Powell River								
A	181.82 ¹	285	2,721	7.7	1,615.6	1,615.6	1,615.6	0.0
B	181.93 ¹	190	2,283	8.1	1,619.7	1,619.7	1,619.8	0.1
C	181.97 ¹	135	1,493	12.3	1,622.4	1,622.4	1,623.0	0.6
D	182.12 ¹	80	1,057	17.4	1,628.4	1,628.4	1,629.3	0.9
E	182.23 ¹	139	2,412	7.6	1,638.0	1,638.0	1,638.1	0.1
F	182.26 ¹	155	3,052	6.0	1,639.1	1,639.1	1,639.2	0.1
G	182.46 ¹	155	2,451	7.5	1,640.8	1,640.8	1,641.0	0.2
H	182.58 ¹	140	2,377	7.7	1,643.2	1,643.2	1,643.6	0.4
I	182.72 ¹	160	2,185	8.4	1,644.0	1,644.0	1,644.4	0.4
J	183.29 ¹	128	1,675	8.1	1,648.1	1,648.1	1,648.7	0.6
K	183.35 ¹	130	1,751	7.8	1,648.8	1,648.8	1,649.5	0.7
L	183.70 ¹	180	1,868	7.3	1,655.8	1,655.8	1,656.0	0.2
Callahan Creek								
A	0.02 ²	100	1,424	5.2	1,646.2	1,646.2	1,647.1	0.9
B	0.06 ²	120	1,979	3.7	1,648.2	1,648.2	1,649.0	0.8
C	0.07 ²	120 ⁴	1,688	4.4	1,648.4	1,648.4	1,649.3	0.9
D	0.33 ²	210 ⁴	2,241	3.3	1,649.6	1,649.6	1,650.4	0.8
E	0.45 ²	160	1,460	5.1	1,650.3	1,650.3	1,651.1	0.8
F	0.70 ²	85	755	9.8	1,653.3	1,653.3	1,653.9	0.6
G	0.85 ²	100	846	8.7	1,656.8	1,656.8	1,656.9	0.1
H	1.00 ²	102 ³	815	9.1	1,659.9	1,659.9	1,660.9	1.0
I	1.10 ²	100/75 ³	694	10.7	1,662.8	1,662.8	1,662.9	0.1
J	1.11 ²	100/65 ³	680	10.9	1,666.6	1,666.6	1,666.6	0.0
K	1.42 ²	119/79 ³	848	8.7	1,675.9	1,675.9	1,676.6	0.7

¹Miles above confluence with the Clinch River

⁴Measured normal to direction of flow

²Miles above confluence with the Powell River

³Width/width within corporate limits

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF APPALACHIA, VA

(WISE CO.)

FLOODWAY DATA

POWELL RIVER AND CALLAHAN CREEK

TABLE 2

12

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	¹ DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY	INCREASE
Looney Creek								
A	0.68	38	174	12.3	1,647.0	1,647.0	1,647.0	0.0
B	1.06	46	267	7.7	1,676.3	1,676.3	1,676.4	0.1
C	1.36	22	197	10.1	1,697.6	1,697.6	1,697.6	0.0
D	1.59	50	213	9.0	1,720.8	1,720.8	1,721.1	0.3
E	1.77	43	248	7.6	1,739.2	1,739.2	1,740.1	0.9

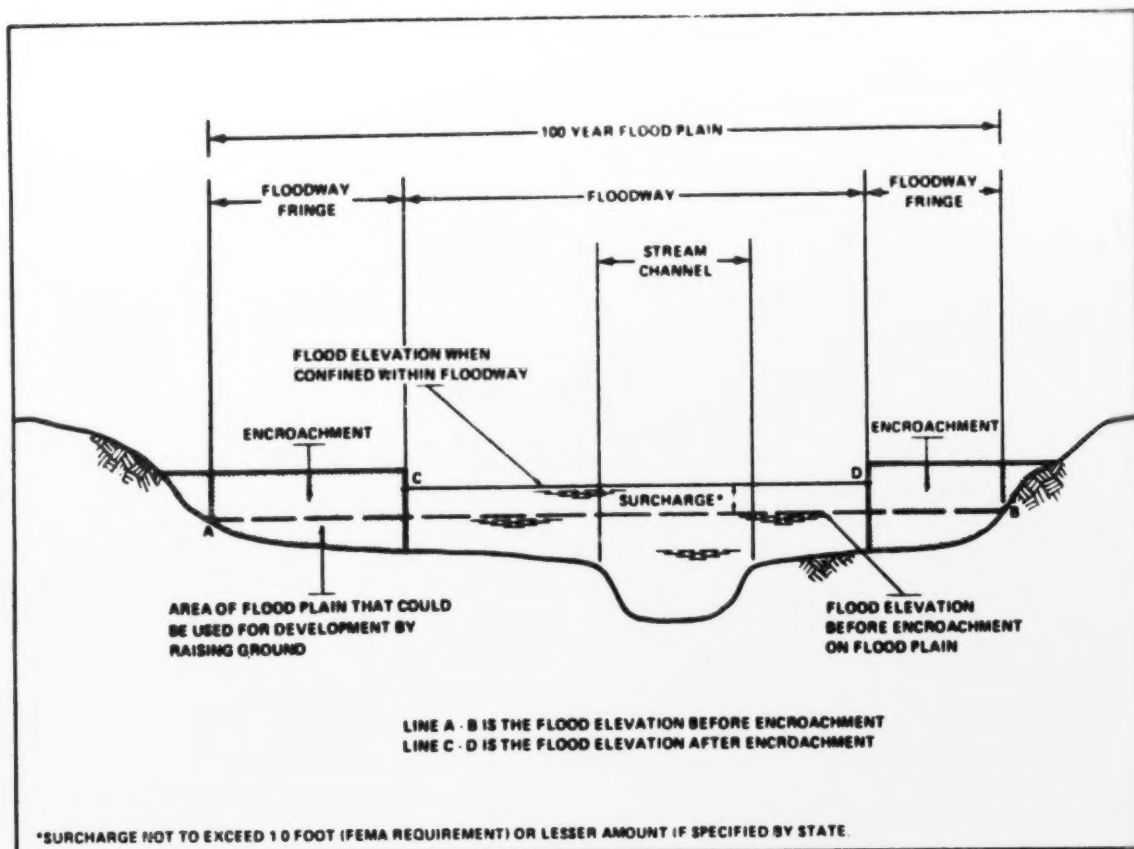
¹Miles above confluence with the Powell River

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
TOWN OF APPALACHIA, VA
(WISE CO.)

FLOODWAY DATA

LOONEY CREEK



Floodway Schematic - Figure 2

5.0 INSURANCE APPLICATION

To establish actuarial insurance rates, data from the engineering study must be transformed into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail in the Town of Appalachia.

5.1 Reach Determinations

Reaches are defined as sections of floodplain that have relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference may not have a variation greater than that indicated in the following tabulation for more than 20 percent of the reach:

<u>Average Difference Between 10- and 100-Year Floods</u>	<u>Variation</u>
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the flooding sources of the Town of Appalachia is shown on the Flood Profiles (Exhibit 1) and summarized in Table 3.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is used to establish relationships between depth and frequency of flooding in any reach. This relationship is then used with depth-damage relationships for various classes of structures to establish actuarial insurance rate tables.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations rounded to the nearest one-half foot, multiplied by 10, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, it is rounded to the nearest whole foot.

5.3 Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the FHF, respectively. A unique zone number is associated with each possible FHF, and varies from 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

- Zone A: Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or FHF's determined.
- Zone A3, A6, A8, A9, A10, and A14: Special Flood Hazard Areas inundated by the 100-year flood; with base flood elevations shown, and zones subdivided according to FHF's.
- Zone B: Areas between the Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected from the 100- or 500-year floods by dike, levee, or other water control structure; areas subject to certain types of 100-year

FLOODING SOURCE	PANEL ¹	ELEVATION DIFFERENCE ² BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ³ ELEVATION ³ (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Powell River							
Reach 1	01	-4.0	-1.3	3.1	040	A8	Varies
Reach 2	01	-7.0	-2.1	4.2	070	A14	Varies
Reach 3	01	-4.7	-1.5	3.5	045	A9	Varies
Callahan Creek							
Reach 1	01	-7.0	-2.1	4.6	070	A14	Varies
Reach 2	01	-4.8	-1.4	4.1	050	A10	Varies
Reach 3	01	-2.8	-0.8	2.4	030	A6	Varies
Looney Creek							
Reach 1	01	-1.5	-0.4	1.2	015	A3	Varies

¹Flood Insurance Rate Map Panel

²Weighted Average

³Rounded to the nearest foot - see map

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF APPALACHIA, VA
(WISE CO.)

FLOOD INSURANCE ZONE DATA

POWELL RIVER CALLAHAN CREEK AND LOONEY CREEK

Zone B: shallow flooding where depths are less than 1.0
(continued) foot; and areas subject to 100-year flooding
from sources with drainage areas less than 1
square mile. Zone B is not subdivided.

Zone C: Areas of minimal flooding; not subdivided.

Flood elevation differences, PHFs, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the community are shown in Table 3.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Town of Appalachia is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevations. Base flood elevation lines show the locations of the expected whole-foot water-surface elevation of the base (100-year) flood. The base flood elevations and zone numbers are used by insurance agents, in conjunction with structure elevations and characteristics, to assign actuarial insurance rates to structures and contents insured under the National Flood Insurance Program.

6.0 OTHER STUDIES

A 1964 flood information report, Floods on Powell River and Callahan Creek in the Vicinity of Appalachia, Virginia has been published (Reference 5). The profiles and flood outlines shown in that report are for different frequencies than are contained within this study, therefore no conflict exists.

A Flood Insurance Study for the unincorporated areas of Wise County has been prepared (Reference 11). The results of that study do not match the results of this study. The flow-frequency estimates were revised after the Wise County study was published. In addition, several new bridges affect the flood elevations at the corporate boundary.

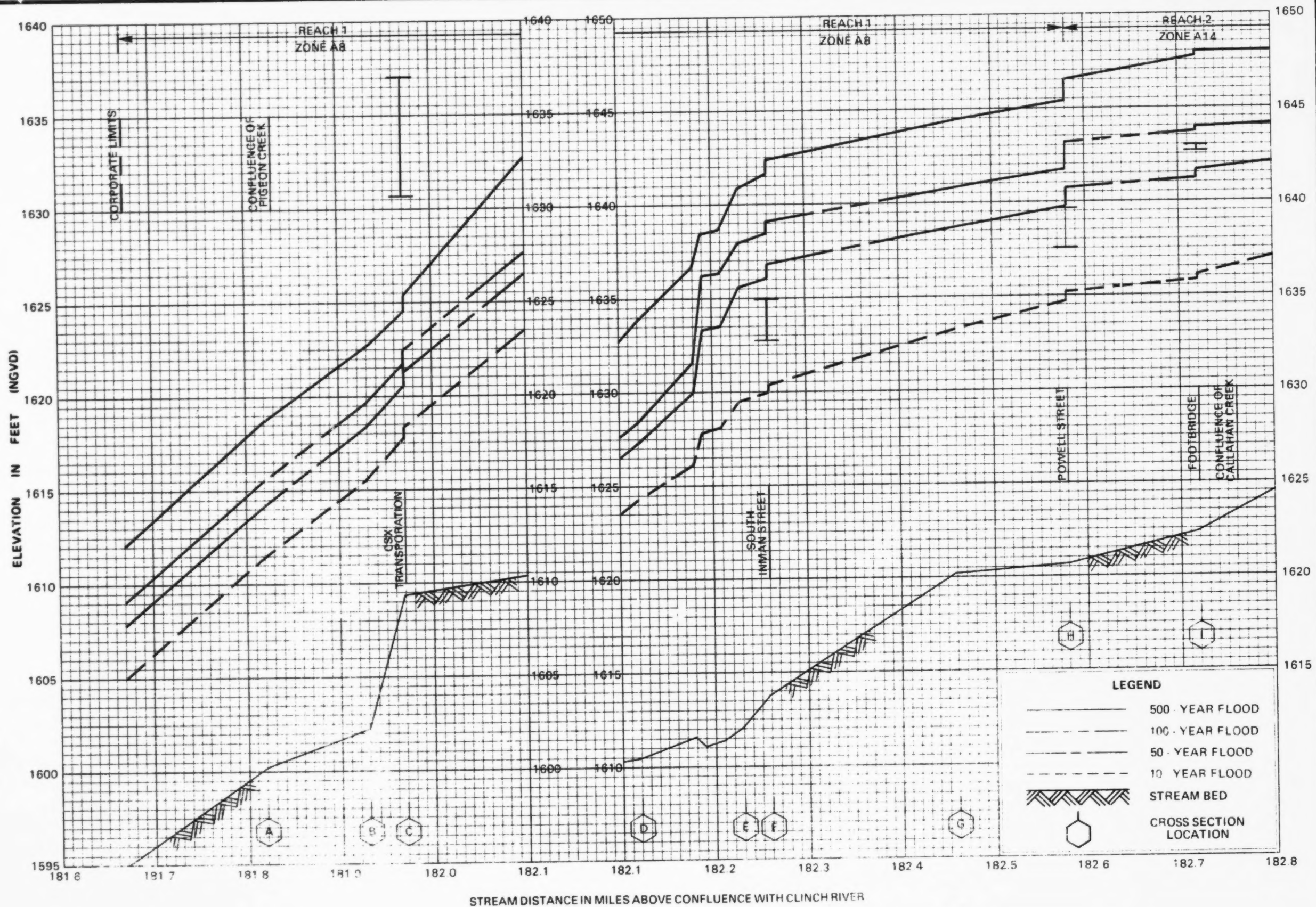
Due to its more up-to-date nature, this study supersedes the previous Flood Insurance Study for the Town of Appalachia (Reference 12).

7.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, Liberty Square Building (Second Floor), 105 South Seventh Street, Philadelphia, Pennsylvania 19106.

8.0 BIBLIOGRAPHY AND REFERENCES

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FLOOD PROFILES

POWELL RIVER

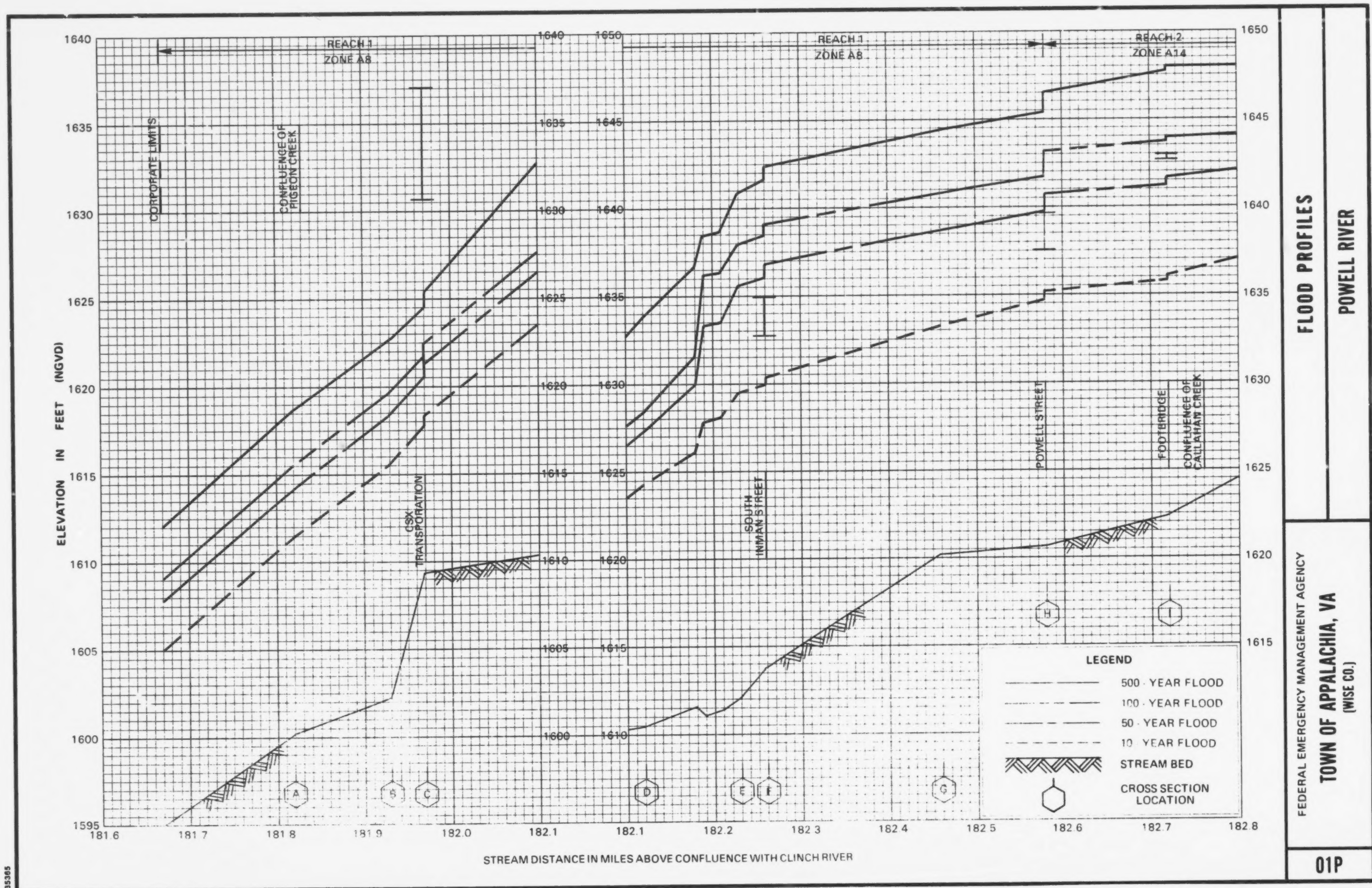
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF APPALACHIA, VA

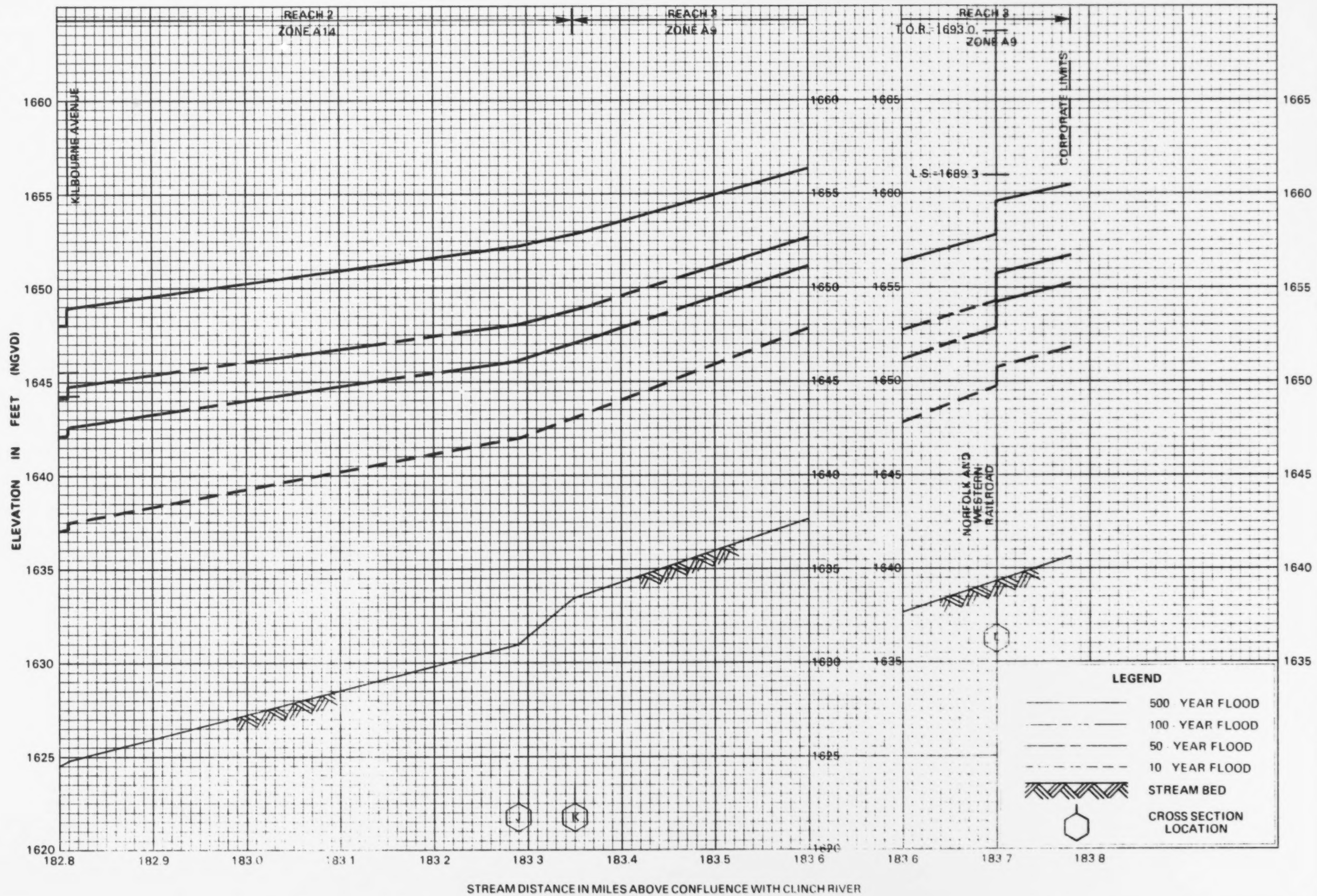
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FLOOD PROFILES

POWELL RIVER

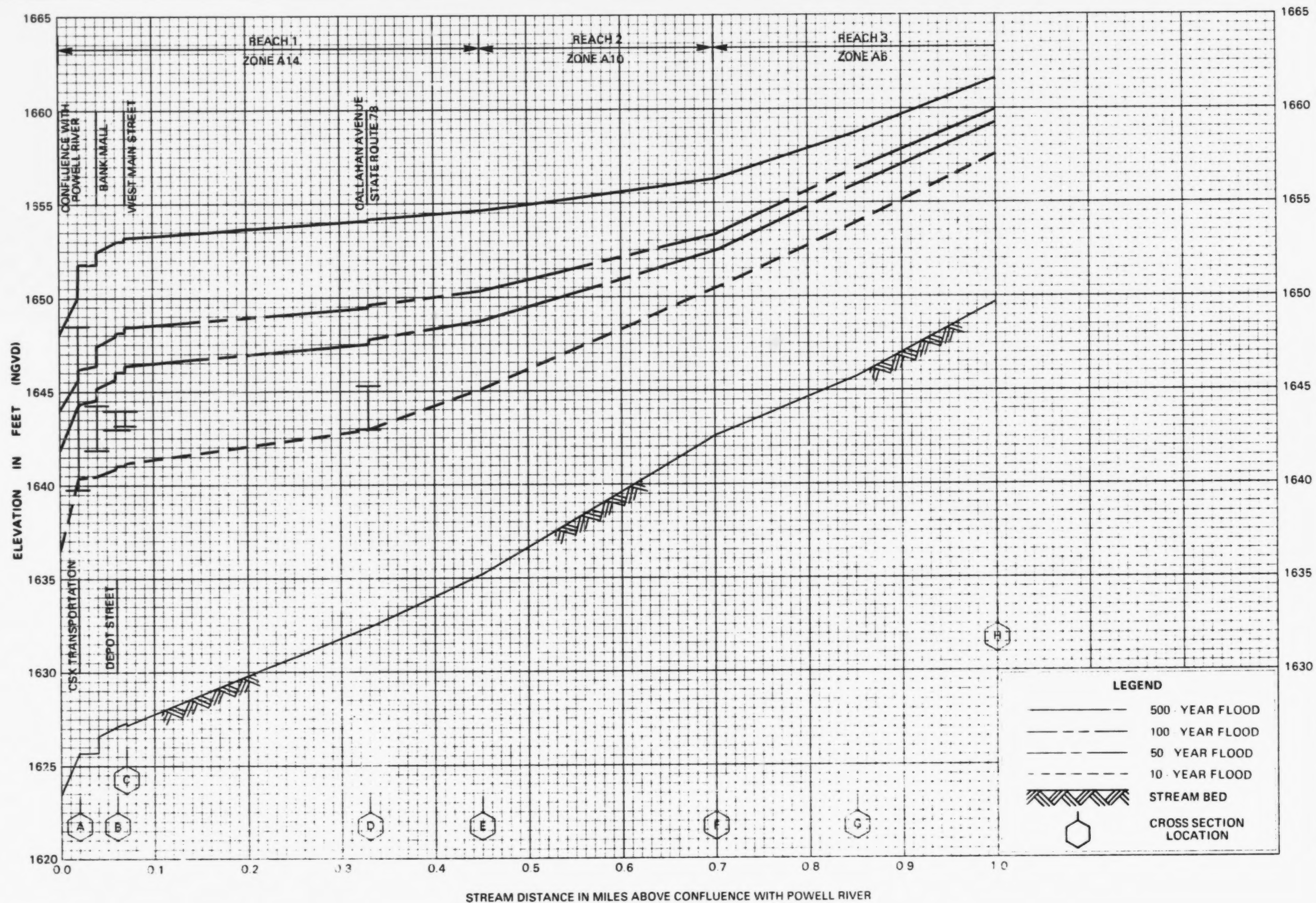
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TOWN OF APPALACHIA, VA

(WISE CO.)

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FLOOD PROFILES

CALLAHAN CREEK

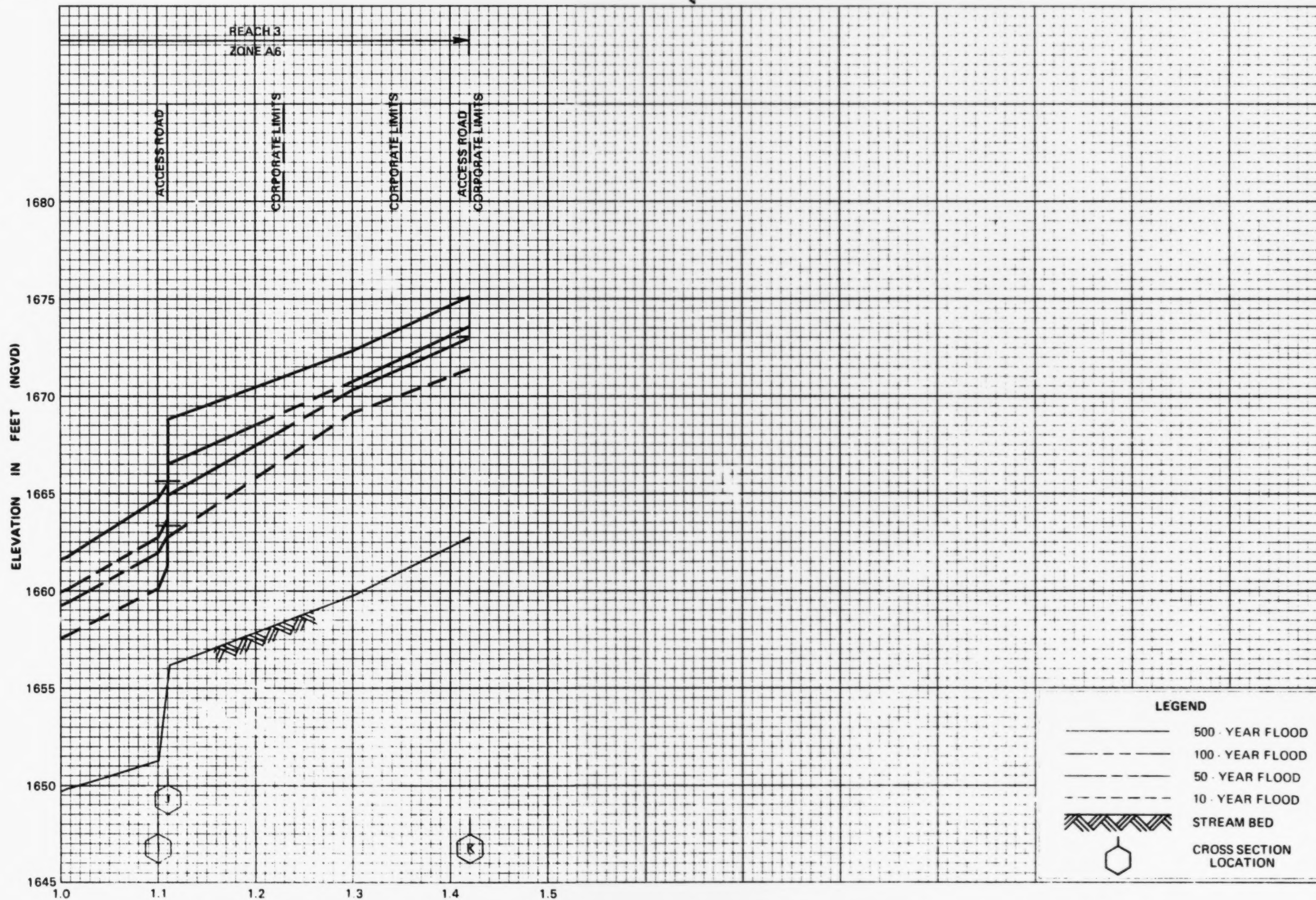
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF APPALACHIA, VA

(WISE CO.)

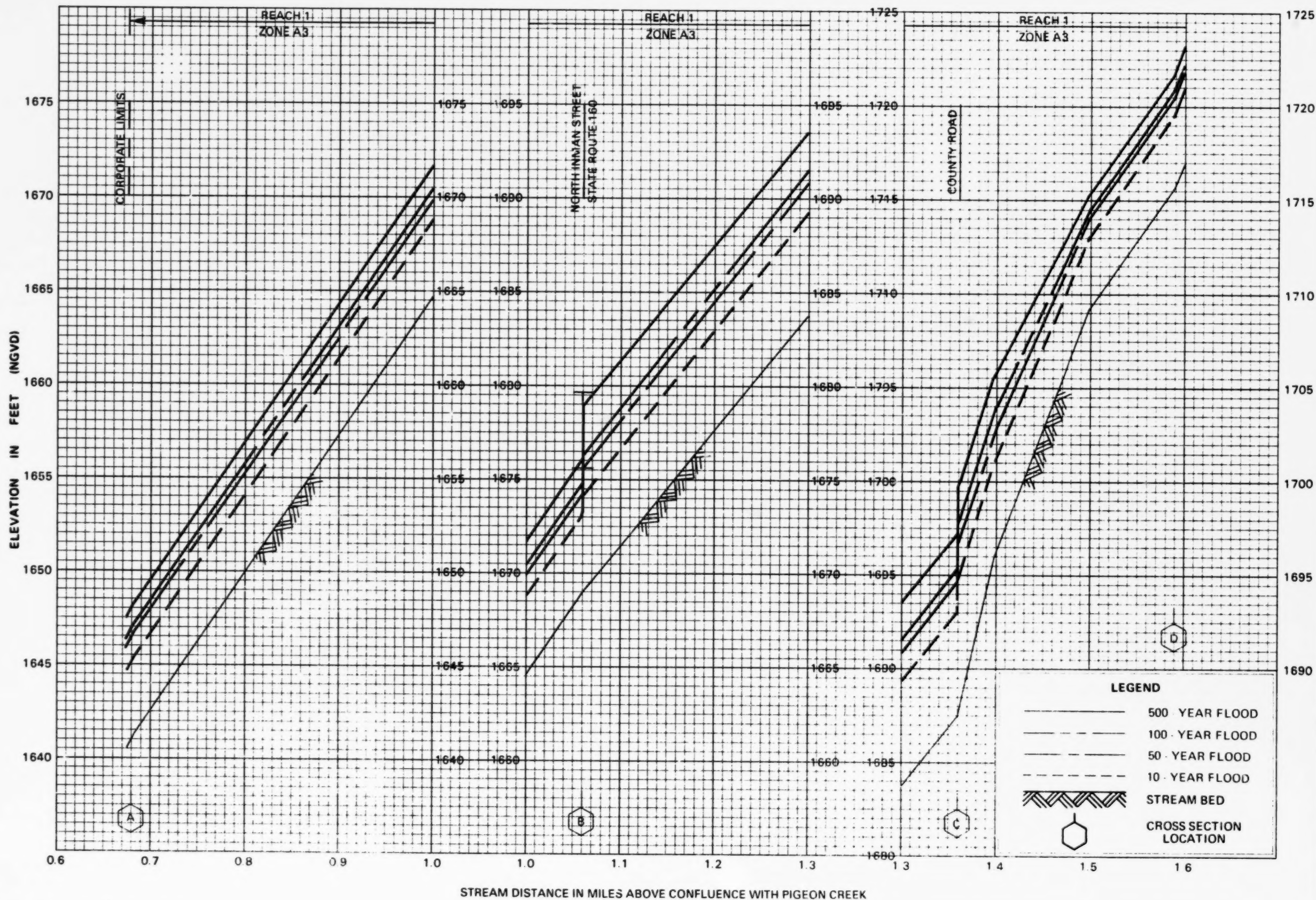
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FLOOD PROFILES
CALLAHAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
TOWN OF APPALACHIA, VA
(WISE CO.)



FLOOD PROFILES

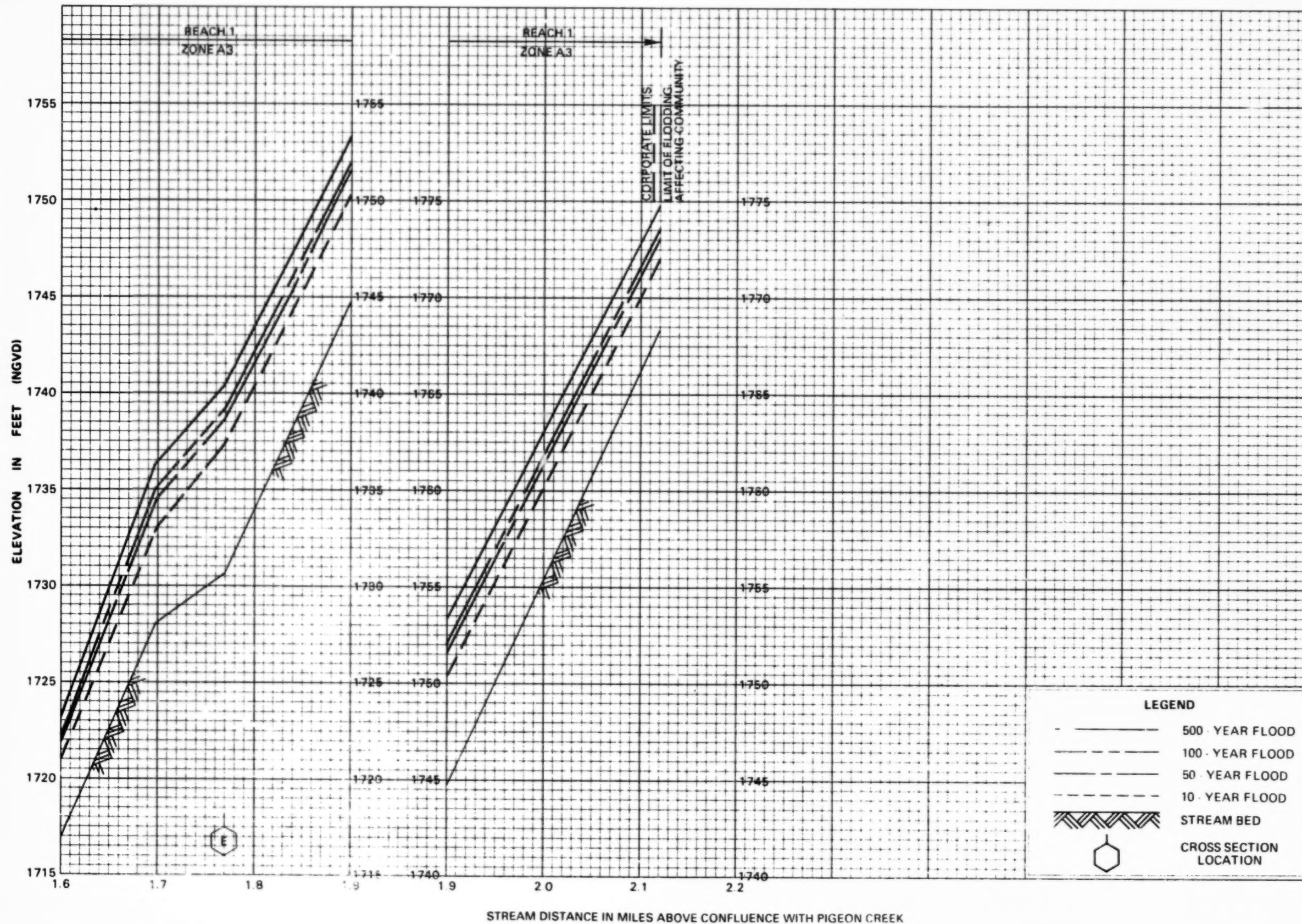
LOONEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF APPALACHIA, VA
(WISE CO.)

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FLOOD PROFILES

LOONEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF APPALACHIA, VA
(WISE CO.)

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